Math 101 – WORKSHEET 11
INTEGRATION BY PARTS

(1) Evaluate the integrals

(a) $\int x e^x \, \mathrm{d}x$

(b) (Final, 2014) $\int x \log x \, \mathrm{d}x$

(c) $\int x^2 \cos x \, \mathrm{d}x$

(d) $\int \log x \, \mathrm{d}x$

(e) (Final, 2013) $\int_0^1 \arctan x \, \mathrm{d}x =$

(2) Now let's play with out toolkit

    (a) Evaluate $\int \frac{\log x}{x} \, dx$

    (b) Evaluate $\int \frac{\log x}{x^2} \, dx$

    (c) (Final, 2010) Let $g(x) = \int_0^1 \left(xe^t - t\right)^2 dt$. Find the minimum value of $g(x)$.

    (d) Evaluate $\int x^3 \log(x^2 + 1) \, dx$